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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,606	07/28/2003	Edward B. Manring	29766-69968	4662

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CUMMINS, INC.
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EXAMINER	
SCHINDLER, DAVID M	
ART UNIT	**PAPER NUMBER**
2862	

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H'A

Office Action Summary	Application No.	Applicant(s)	
	10/628,606	MANRING ET AL.	
	Examiner	Art Unit	
	David Schindler	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25 and 27-45* is/are rejected.

7)☒ Claim(s) *26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Bot Ledynh
Primary Examiner

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the communication filed 6/30/2005.

Specification

2. The use of the trademark SOMALOY 500 and SOMALOY 550 has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 25, 27, 28, 30, 38, 39, 40, 41, 42, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (herein referred to as "Rossi") (2002/0084777) in view of Lavan, Jr., et al. (herein referred to as "Lavan") (5,729,134) and Wright et al. (herein referred to as "Wright") (6,657,847).

As to Claim 25,

Rossi discloses a flux path closure device coupled to the magnetic component to define a closed flux path through the flux path closure device and the magnetic component, an excitation coil responsive to an excitation signal to generate a magnetic flux in the closed flux path, and a monitoring device configured to monitor the voltage across, and a current through, the excitation coil resulting from application of the excitation signal thereto, and to compute the magnetic flux as a function of the voltage, the current, and the effective resistance ((Figure 4) and (Page 2, Paragraph [0024]) and (Page 2, Paragraph [0025]) and (Page 3, Paragraph [0032])).

Rossi does not disclose the use of a transient excitation signal, and the monitoring device configured to compute an effective resistance of the excitation coil as a function of the voltage and the current.

Lavan discloses the use of a transient excitation signal (Abstract, Lines 4-6).

It would have been obvious to a person of ordinary skill in the art to modify Rossi to include the use of a transient excitation signal as taught by Lavan, Jr. et al. in order to allow high peak power without generating high losses due to continuous current flow in the coil (Column 3, Lines 32-35).

Wright discloses computing an effective resistance of the excitation coil as a function of the voltage and the current (Column 6, Lines 18-28).

It would have been obvious to a person of ordinary skill in the art to modify Rossi to include the monitoring device configured to compute an effective resistance of the excitation coil as a function of the voltage and the current given the above disclosure and teaching of Wright in order to have real time resistance measurements so that compensation may be made for changes in coil resistance due to temperature (Column 6, Lines 18-24).

It is noted that the application of a transient excitation signal would result in the generation of a transient magnetic flux, and therefore this is the flux that would be computed by Rossi.

As to Claim 27,

Rossi discloses the monitoring device is configured to compute the magnetic flux as a function of the voltage, the current, and a number of turns in the excitation coil (Page 3, Paragraph [0032]).

Rossi does not disclose the use of a transient excitation signal.

Lavan discloses the use of a transient excitation signal (Abstract, Lines 4-6).

It would have been obvious to a person of ordinary skill in the art to modify Rossi to include the use of a transient excitation signal as taught by Lavan in order to allow high peak power without generating high losses due to continuous current flow in the coil (Column 3, Lines 32-35).

It is noted that the application of a transient excitation signal would result in the generation of a transient magnetic flux, and therefore this is the flux that would be computed by Rossi.

As to Claim 28,

Rossi discloses the monitoring device is configured to compute the magnetic flux as a ratio of an integral of a function over time and the number of turns of the excitation coil, the function being a difference between the voltage and a product of the current and the effective resistance of the excitation coil (Page 3, Paragraph [0032]).

Rossi does not disclose the use of a transient excitation signal.

Lavan discloses the use of a transient excitation signal (Abstract, Lines 4-6).

It would have been obvious to a person of ordinary skill in the art to modify Rossi to include the use of a transient excitation signal as taught by Lavan in order to allow high peak power without generating high losses due to continuous current flow in the coil (Column 3, Lines 32-35).

It is noted that the application of a transient excitation signal would result in the generation of a transient magnetic flux, and therefore this is the flux that would be computed by Rossi.

As to Claim 30,

Rossi discloses the flux path closure device defines a cavity therein sized to receive the excitation coil therein (Figure 3 / note the space in between U-shaped core (16).

As to Claim 38,

Rossi discloses a signal source (14) configured to produce the excitation signal (Figure 2)

Rossi does not disclose the signal is a transient excitation signal.

Lavan discloses a power source provides a transient excitation signal to a coil (Abstract, Lines 4-6).

It would have been obvious to a person of ordinary skill in the art to modify Rossi to include the signal is a transient excitation signal given the above disclosure and teaching of Lavan in order to allow high peak power without generating high losses due to continuous current flow in the coil (Column 3, Lines 32-35).

As to Claim 39,

Rossi does not disclose the signal source is a current source, and wherein the transient excitation signal is a transient current signal.

Lavan discloses an input current pulse (Column 3, Lines 27-31).

It would have been obvious to a person of ordinary skill in the art to modify Rossi to include the signal source is a current source, and wherein the transient excitation signal is a transient current signal given the above disclosure and teaching of Lavan in order to allow high peak power without generating high losses due to continuous current flow in the coil (Column 3, Lines 32-35).

As to Claim 40,

Rossi discloses the signal source is a voltage source.

Rossi does not disclose wherein the transient excitation signal is a transient voltage signal.

Lavan discloses the transient excitation signal is a transient voltage signal (Abstract, Lines 4-6).

It would have been obvious to a person of ordinary skill in the art to modify Rossi to include the transient excitation signal is a transient voltage signal as taught by Lavan in order to allow high peak power without generating high losses due to continuous current flow in the coil (Column 3, Lines 32-35).

As to Claim 41,

Rossi discloses the monitoring device includes means for monitoring the voltage across the excitation coil (Figure 5).

As to Claim 42,

Rossi discloses the monitoring device includes means for monitoring the current through the excitation coil (Figure 5).

As to Claim 45,

Rossi discloses further including a flux coil separate from the excitation coil, wherein the monitoring device is configured to monitor a voltage across the flux coil and compute the transient magnetic flux as a function of the voltage across the flux coil and a number of turns in the flux coil ((Figure 4) and (Page 3, Paragraph 0035])).

6. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (herein referred to as "Rossi") (2002/0084777) in view of Lavan, Jr., et al. (herein referred to as "Lavan") (5,729,134) and Wright et al. (herein referred to as "Wright") (6,657,847) and in further view of Synder (5,394,084).

Rossi in view of Lavan and Wright disclose as explained above.

Rossi in view of Lavan and Wright do not disclose the magnetic component defines a cavity therein sized to receive the excitation coil therein.

Synder discloses the magnetic component defines a cavity therein sized to receive the excitation coil therein ((Figure 1) and (Column 3, Line 51)).

It would have been obvious to a person of ordinary skill in the art to modify Rossi in view of Lavan and Wright to include the magnetic component defines a cavity therein sized to receive the excitation coil therein as taught by Synder in order to increase the sensitivity of the apparatus (Column 4, Lines 3-8).

7. Claims 31 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (herein referred to as "Rossi") (2002/0084777) in view of Lavan, Jr., et al. (herein referred to as "Lavan") (5,729,134) and Wright et al. (herein referred to as "Wright) and in further view of Burd (WO 02/097424).

As to Claim 31,

Rossi in view of Lavan and Wright disclose as explained above.

Rossi in view of Lavan and Wright do not disclose the flux path closure device is fabricated from a material that suppresses eddy current therein.

Burd discloses the flux path closure device (12) is fabricated from a material that suppresses eddy current therein (Page 5, Lines 14-15).

It would have been obvious to a person of ordinary skill in the art to modify Rossi in view of Lavan and Wright to include the flux path closure device is fabricated from a

material that suppresses eddy current therein in order to produce clear and precise results (Page 5, Last Line).

As to Claim 34,

Rossi in view of Lavan and Wright do not disclose the flux path closure device is fabricated from laminated layers of iron.

Burd discloses the flux path closure device is fabricated from laminated layers of iron (Page 5, Lines 14-15)

It would have been obvious to a person of ordinary skill in the art to modify Rossi in view of Lavan and Wright to include the flux path closure device is fabricated from laminated layers of iron in order to reduce the effect of eddy currents (Page 5, Lines 14-15).

8. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (herein referred to as "Rossi") (2002/0084777) in view of Lavan, Jr., et al. (herein referred to as "Lavan") (5,729,134) and Wright et al. (herein referred to as "Wright) and Burd (WO 02/097424) and in further view of Spencer et al. (herein referred to as "Spencer") (2004/0152261).

As to Claim 32,

Rossi in view of Lavan, Wright, and Burd disclose as explained above.

Rossi in view of Lavan, Wright, and Burd do not disclose the flux path closure device is fabricated from oxide-coated, pressed metal particles.

Burd discloses the flux path closure device is fabricated from pressed metal

(iron) particles which are coated with a non-conducting material (Page 5, Lines 16-18).

It would have been obvious at the time of the invention to modify Rossi in view of Lavan, and Wright to include the flux path closure device is fabricated from pressed metal (iron) particles which are coated with a non-conducting material as taught by Burd in order to produce even clearer and more precise results (Page 5, Last Line).

Rossi in view of Lavan, Wright, and Burd does not disclose that the non-conducting material is an oxide.

Spencer discloses non-conductive oxides (Page 3, Left Column, Paragraph (0031), Line 19).

It would have been obvious at the time of the invention to modify Rossi in view of Lavan, Wright, and Burd to include non-conductive oxides as taught by Spencer in order to protect the pressed metal particles.

As to Claim 33,

Rossi in view of Lavan, and Wright do not disclose the metal particles are iron particles.

Burd discloses the metal particles are iron particles (Page 5, Lines 14-19).

It would have been obvious to a person of ordinary skill in the art to modify Rossi in view of Lavan, and Wright to include the metal particles are iron particles in order to further reduce eddy currents and to produce even clearer, more precise results (Page 5, Lines 18-19).

9. Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (herein referred to as "Rossi") (2002/0084777) in view of Lavan, Jr., et al. (herein referred to as "Lavan") (5,729,134) and Wright et al. (herein referred to as "Wright) and in further view of Juds et al. (herein referred to as "Juds") (4,922,197).

As to Claim 35,

Rossi in view of Lavan and Wright disclose as explained above.

Rossi in view of Lavan and Wright do not disclose a spacer positioned between the flux path closure device and the magnetic component with the closed flux path extending therethrough.

Juds discloses a spacer (54) positioned between the flux path closure device (10) and the magnetic component (26) with the closed flux path extending therethrough (Figure 5).

It would have been obvious to a person of ordinary skill in the art to modify Rossi in view of Lavan and Wright to include a spacer positioned between the flux path closure device and the magnetic component with the closed flux path extending therethrough as taught by Juds in order to prevent debris from causing damage to the sensor.

As to Claim 36,

Rossi in view of Lavan and Wright do not disclose the spacer is formed of a non-magnetic material.

Juds et al. discloses the spacer (54) is formed of a non-magnetic material (non-ferrous stainless steel) (Column 5, Lines 13-14).

It would have been obvious at the time of the invention to modify Rossi in view of Lavan and Wright toinclude the spacer is formed of a non-magnetic material as taught by Juds et al. in order to prevent the spacer from generating or guiding a magnetic flux which could interfere with the functionality of the device.

10. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (herein referred to as "Rossi") (2002/0084777) in view of Lavan, Jr., et al. (herein referred to as "Lavan") (5,729,134) and Wright et al. (herein referred to as "Wright) and Juds et al. (herein referred to as "Juds") (4,922,197) and Pearson et al. (herein referred to as "Pearson") (2002/0179830).

Rossi in view of Lavan and Wright and Juds discloses as explained above.

Rossi in view of Lavan and Wright and Juds does not disclose the spacer is formed of an electrically non-conductive material.

Pearson discloses the spacer is formed of an electrically non-conductive material (Page 3, Right Column, Top Paragraph, Lines 3-10).

It would have been obvious to a person of ordinary skill in the art to modify Rossi in view of Lavan and Wright and Juds to include the spacer is formed of an electrically non-conductive material as taught by Pearson in order to prevent the spacer from generating or guiding a magnetic flux which could interfere with the functionality of the device.

11. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (herein referred to as "Rossi") (2002/0084777) in view of Lavan, Jr., et al. (herein

referred to as "Lavan") (5,729,134) and Wright et al. (herein referred to as "Wright) and in further view of Sakamoto et al. (herein referred to as "Sakamoto") (5,541,777).

Rossi in view of Lavan and Wright disclose as explained above.

Rossi in view of Lavan and Wright do not disclose a graphing system configured to plot the transient magnetic flux as flux linkage vs. time.

Sakamoto discloses a graphing system configured to plot flux linkage vs. time (Figure 6a).

It would have been obvious to a person of ordinary skill in the art to modify Rossi in view of Lavan and Wright to include a graphing system configured to plot the transient magnetic flux as flux linkage vs. time given the above disclosure and teaching of Sakamoto in order allow a user to quickly and easily determine the flux linkage.

It is noted that a graphing system must have been used generate the plot of Figure 6a. It is additionally noted that the application of a transient excitation signal (taught in Claim 25) would result in the generation of a transient magnetic flux, and thus this is the flux that would be computed by Rossi and plotted given the above teaching.

12. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rossi et al. (herein referred to as "Rossi") (2002/0084777) in view of Lavan, Jr., et al. (herein referred to as "Lavan") (5,729,134) and Wright et al. (herein referred to as "Wright) and in further view of Nippert (5,600,237).

Rossi in view of Lavan and Wright disclose as explained above.

Rossi in view of Lavan and Wright do not disclose a graphing system configured

to plot the transient magnetic flux as flux linkage vs. current.

Nippert discloses a graphing system configured to plot flux linkage vs. current (Figure 1).

It would have been obvious to a person of ordinary skill in the art to modify Rossi in view of Lavan and Wright to include a graphing system configured to plot the transient magnetic flux as flux linkage vs. current given the above disclosure and teaching of Nippert in order allow a user to quickly and easily determine the flux linkage.

It is noted that a graphing system must have been used generate the plot of Figure 1. It is additionally noted that the application of a transient excitation signal (taught in Claim 25) would result in the generation of a transient magnetic flux, and thus this is the flux that would be computed by Rossi and plotted given the above teaching.

Allowable Subject Matter

13. Claim 26 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is an examiner's statement of reasons for allowance:

As to Claim 26,

The primary reason for the allowance of claim 26 is the inclusion of the monitoring device is configured to compute an integrated voltage as an integral of a number of voltage values measured across the excitation coil over a duration of the transient excitation signal, and to compute an integrated current as an integral of a

number of current values measured through the excitation coil over the duration of the transient excitation signal, and wherein the monitoring device is configured to compute the effective resistance of the excitation coil as a ratio of the integrated voltage and the integrated current. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

15. Applicant's arguments with respect to claims 21-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Schindler
Examiner
Art Unit 2862

DS